

WHAT IS CLAIMED IS:

1. An apparatus capable of projecting light comprising:
a frame;
a lens system disposed within said frame;
a horizontal support surface generally associated with said frame capable of holding a semiconductor wafer;
a final lens element in said lens system, positioned near a first end of said frame, said final lens element having a final lens element surface, said final lens element surface capable of being positioned near said semiconductor wafer; and
a light source positioned near a second end of said frame, said light source capable of passing light through said lens system;
wherein said final lens element is capable of movement relative to said frame.
2. The apparatus of claim 1 wherein a proximal lens surface on said final lens element surface is partially or totally submerged in a liquid when in an operable position.
3. The apparatus of claim 2 further comprising a first motion control device capable of producing an x, y, and z dimensional movement between said horizontal support surface relative to said frame.
4. The apparatus of claim 3 wherein said final lens element is coupled to a second motion control device capable of moving said final lens element relative to said frame.
5. The apparatus of claim 4 wherein said final lens element is capable of angular movement about an axis.
6. The apparatus of claim 4 wherein said final lens element is capable of angular movement about a single axis.
7. The apparatus of claim 4 wherein one or more coupling points are coupled to said final lens element by extension connectors.
8. The apparatus of claim 3 wherein said first motion control device is selected from one or more of the group consisting of a computer system, a motor, a belt

system, a threaded or keyed shaft, a gear system, a cam mechanism, and a manual mechanism controlled by an operator.

9. The apparatus of claim 4 wherein a relative horizontal velocity between said proximal lens surface and said horizontal support surface is small enough to ensure that turbulence and air bubbles created in said liquid by said relative horizontal velocity do not cause significant degradation of an imaging quality of the apparatus.
10. The apparatus of claim 9 wherein said final lens element rotates about an axis coupled to said frame at a constant angular velocity, and a horizontal velocity of said horizontal support surface relative to said frame is constant.
11. The apparatus of claim 9 wherein said final lens element rotates about an axis coupled to said frame at a variable angular velocity, and a horizontal velocity of said horizontal support surface relative to said frame is constant.
12. The apparatus of claim 9 wherein said final lens element rotates about an axis coupled to said frame at a constant angular velocity, and a horizontal velocity of said horizontal support surface relative to said frame is variable.
13. The apparatus of claim 9 wherein said final lens element rotates about an axis coupled to said frame at a variable angular velocity, and a horizontal velocity of said horizontal support surface relative to said frame is variable.
14. The apparatus of claim 2 wherein said liquid is selected from the group consisting of:
deionized water,
perfluorinated polyethers.
15. The apparatus of claim 1 wherein said apparatus exists in a closed environment where an atmosphere of said closed environment is primarily composed of one or more elements or compositions selected from the group consisting of:
argon,
dry nitrogen, and
air.

16. The apparatus of claim 1 wherein said apparatus exists in a closed environment where an atmosphere of said closed environment comprises one or more inert optically transparent gasses.
17. The apparatus of claim 1 wherein a cross section said final lens element is substantially cylindrical.
18. The apparatus of claim 1 wherein said final lens element comprises a first curved surface region and a second curved surface region where a degree of curvature of said first curved surface region is greater than the degree of curvature of said second curved surface region and said second curved surface region substantially faces said horizontal support surface.
19. The apparatus of claim 1 wherein said final lens element further comprises a first curved surface region and a second curved surface region where the degree of curvature of said first curved surface region is less than the degree of curvature of said second curved surface region and said second curved surface region substantially faces said horizontal support surface.
20. The apparatus of claim 1 wherein a cross section of said final lens is cylindrical.
21. A method for moving a final lens element of a lens system in a frame in an optical lithography apparatus comprising the steps of:
placing a wafer on a horizontal support surface capable of horizontal motion relative to said frame containing said lens system,
securing said wafer on said horizontal support surface,
orienting said final lens element in said lens system to a start position, and
moving said final lens element synchronously with said horizontal support surface during a scan of said wafer.
22. The method of claim 21 wherein following securing said wafer on said horizontal support surface the method further comprises the steps of:
immersing said wafer in a liquid; and,
immersing a portion of said final lens element into said liquid near a top surface of said wafer.

23. The method of claim 22, the step of moving said final lens element synchronously with said horizontal support surface further comprising the step of maintaining a relative horizontal velocity between a proximal lens surface of said final lens element and a horizontal velocity of said wafer small enough to ensure that turbulence and air bubbles created in said liquid by said relative horizontal velocity do not cause significant degradation of an imaging quality of the apparatus.
24. The method of claim 23 wherein the step of moving said final lens element synchronously with said horizontal support surface comprises the step of rotating said final lens element about an axis coupled to said frame.
25. The method of claim 24, the step of moving said final lens element synchronously with said horizontal support surface further comprises the steps of:
rotating said final lens element at a constant angular velocity;
moving said horizontal support surface relative to said frame at a constant horizontal velocity.
26. The method of claim 24, the step of moving said final lens element synchronously with said horizontal support surface further comprises the steps of:
rotating said final lens element at a variable angular velocity;
moving said horizontal support surface relative to said frame at a constant horizontal velocity relative to said frame.
27. The method of claim 24, the step of moving said final lens element synchronously with said horizontal support surface further comprises the steps of:
rotating said final lens element at a constant angular velocity;
moving said horizontal support surface relative to said frame at a variable horizontal velocity relative to said frame.

28. The method of claim 24, the step of moving said final lens element synchronously with said horizontal support surface further comprises the steps of:
rotating said final lens element at a variable angular velocity;
moving said horizontal support surface relative to said frame at a variable horizontal velocity relative to said frame.
29. The method of claim 21 where motion of said final lens element synchronously is created by one or more control mechanisms selected from the group consisting of:
a computer system,
a motor,
a gear system,
a cam, and
a manual control of an operator.
30. The method of claim 21 wherein the method following scanning said wafer and moving said final lens element synchronously further comprises the step of:
repositioning said final lens element to a next field of said wafer after scanning each field of said wafer until necessary scanning of said wafer is complete.
31. The method of claim 21 wherein the method following scanning said wafer and moving said final lens element synchronously further comprises the steps of:
removing said final lens element from said liquid environment;
eliminate said liquid environment by removing said liquid;
removing said wafer from said liquid environment; and
releasing and removing said wafer.
32. The method of claim 21 wherein the method following scanning said wafer and moving said final lens element synchronously further comprises the step of
cleaning said final lens element.
33. The method of claim 21 wherein the method during scanning said wafer and moving said final lens element synchronously further comprises the step of
adjusting a z-dimension position of said horizontal support surface such that the

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resolution of the scanning is nearly optimized.